

# CĂTĂLINA CANGEA

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## PERSONAL PROFILE

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**Senior Research Scientist** at Google DeepMind, working on multimodal and generative methods at scale, with an additional focus on designing datasets and evaluation frameworks. Best motivated by building ML tools to help solve real-world challenges. Obtained my PhD at the University of Cambridge.

## PREVIOUS PROFESSIONAL EXPERIENCE

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### Research Scientist—DeepMind

October 2021–April 2023

Multimodal learning and generative methods for long-range sequential data. Co-led several research projects, published at ICML 2022 and hosted an RS intern. External mentoring at EEML and LOGML.

### Research Scientist Internship—DeepMind

July 2020–November 2020

Hosted by Piotr Mirowski in the Robotics, Embodied Agents and Lifelong learning (REAL) team led by Raia Hadsell.

### ML Research Consultancy—Relation Therapeutics

June 2020–July 2020

Developing (graph-)ML solutions to aid in drug development and repurposing efforts.

### AI Residency—X, the moonshot factory

May 2019–August 2019

Worked on an early-stage project, adapting SoTA techniques to track changes in code. Patent issued.

### ML Research Internship—Mila

July 2018–September 2018

Collaboration with Aaron Courville on a visual reasoning project which resulted in a novel benchmark and alternative perspective on EQA-style tasks. BMVC publication and NeurIPS ViGIL spotlight talk.

### Software Engineer Internship—Facebook

June 2016–September 2016

Worked on the LogDevice team, making client operations on a distributed RocksDB data store more efficient and flexible, while leading to fewer system failures.

### Software Engineer Internship—Facebook

July 2015–September 2015

Worked on iOS Product Infrastructure to reduce the time taken by the Facebook iOS app to load content close to the screen current view. Improved the infrastructure and network request prioritisation system.

### Student Training in Engineering Program—Google

June 2014–September 2014

Added processing progress for video uploads on YouTube. Developed a JavaScript client implementation that requests processing information from the server and thumbnail rendering of processing videos.

## SELECTED PUBLICATIONS

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### Active Acquisition for Multimodal Temporal Data: A ... Decision-Making Task (second)

Active feature acquisition for high-dimensional, multimodal inputs. We solve a synthetic scenario and learn cost-reactive acquisition on Kinetics-700 and AudioSet. *TMLR 2023, NeurIPS-W FMDM 2022*.

### General-purpose, long-context autoregressive modeling with Perceiver AR (second)

Autoregressive architecture that can attend to over 100k tokens, bypassing the  $O(N^2)$  complexity of Transformers. Strong performance and/or SoTA on image, language and music tasks. *ICML 2022*.

## Message Passing Neural Processes (joint first)

Neural Process with relational inductive bias for structured datasets. Strong generalisation on Cellular Automata tasks, significant gains in arbitrary-labelling and few-shot tasks. *ICLR-W GTRL 2022*.

## VideoNavQA: Bridging the Gap between Visual and Embodied QA (first)

Novel task that studies QA performance in EQA-like settings with nearly-ideal navigation paths. Generalised VQA models for temporal reasoning. *BMVC 2019, NeurIPS-W 2019 ViGIL* spotlight.

## XFlow: Cross-modal Deep Neural Networks for Audiovisual Classification (first)

Cross-modal dataflow multimodal architectures. SOTA on benchmarks. *IEEE Transactions on Neural Networks and Learning Systems 2019, ARM Research Summit 2017, ICDL-EPIROB-W 2017 CMCML*.

## EDUCATION

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### Department of Computer Science and Technology, University of Cambridge, UK

PhD in Machine Learning (10/2017–03/2021) *No corrections (Examiners: Nic Lane, Xavier Bresson)*

MPhil in Advanced Computer Science (10/2016–07/2017) *Distinction*

BA in Computer Science (10/2013–06/2016) *First Class*

### Colegiul Național "I.L.Caragiale", Ploiești, România

Computer Science & Mathematics (09/2009–05/2013) *Valedictorian*

## EXTRACURRICULAR ACTIVITIES

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**Organiser**, ViGIL Workshop, North American Chapter of the ACL 2021 2020–June 2021

**Machine Learning Teaching Fellow**, Cambridge Spark May 2018–May 2021

**Chair/Deputy Chair**, women@CL, University of Cambridge October 2018–July 2020

## ACADEMIC TEACHING / SUPERVISING

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**Lectures:** *Graph Generation and Probabilistic Methods - R250 Advanced Topics in ML and NLP (Master's course)* (2021), *Graph Generation Methods - R250* (2020).

**Master's projects:** *Machine Unlearning* (2020–21), *Structure-aware Generation of Molecules in Protein Pockets* (2020–21), *Goal-conditioned Reinforcement Learning in the Presence of an Adversary* (2019–20, NeurIPS-W DeepRL), *Representation Learning for Spatio-Temporal Graphs* (2018–19, ICLR-W RLGM), *Dynamic Temporal Analysis for Graph Structured Data* (2018–19, ICLR-W RLGM).

**Undergraduate projects:** *Benchmarking Graph Neural Networks using Wikipedia* (2019–20, ICML-W GRL+ spotlight), *Multimodal Relational Reasoning for Visual Question Answering* (2019–20), *The PlayStation Reinforcement Learning Environment* (2018–19, NeurIPS-W DeepRL), *Deep Learning for Music Recommendation* (2017–18).

**Courses:** AI, Databases, Discrete Maths, Foundations of CS, Logic & Proof, ML & Real-World Data.

## LANGUAGES

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English (fluent), French (beginner), Romanian (native)

## INTERESTS

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**Music** Piano, guitar, vocals; live performances, recording (Native Instruments, Ableton Live)

**Sports** Rowing (Darwin/King's College 2<sup>nd</sup>/1<sup>st</sup> VIII) ('16–'21), cycling, yoga